Psychosis and homicide

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INTRODUCTION

People with psychosis rarely inflict legal deaths, for example in declared war. 'Intentional homicide' – unlawful death purposefully inflicted on a person by another person – is the one form of violent death other than suicide in which they may be overinvolved, but with a frequency that excludes them from anything but an indirect footnote in the 2013 UN Office on Drugs and Crime Global Study on Homicide [1&&]. Nevertheless, psychosis and homicide are inextricably linked in the public mind and in law, driving fear and prejudice, but also a form of compassion in the criminal courts taking mental state into account when convicting, sentencing or otherwise ordering placement. In the United Kingdom, though, hospital orders from court for people with mental illness who have killed have been falling since 2005 [2&&]. In 2017, the Sentencing Council for England and Wales launched a consultation on the manslaughter guideline [3&]. Questions included whether evidence of planning or weapon use or substance use at the time of the killing should, in effect, mitigate against health service disposal. How far can empirical research evidence help here? A small, French qualitative study of psychiatric expert witnesses suggests that they too would welcome such help [4&].

Although we have chosen to exclude single case reports in our review, worldwide, they often drive substantial legal and public policy changes. The McNaughton rules on legal insanity form an early example (1843) [5]. In the USA, in 1999, 'Kendra's law' on involuntary outpatient commitment followed a man, lapsed from years of intermittent treatment for psychosis [6], killing Kendra Webdale [7]. In Japan, law allowing specialist forensic psychiatric service development followed a man's running amok in a girls'' school [8]. In February 2017, however, Donald Trump repealed Obama's regulation restricting gun purchase by people with mental disorder [9], then, in November 2017, said of a new mass shooting 'isn't a guns situation' but 'a mental health problem at the highest level' [10]. This fits with a wider populist view. Examination of a random 25% sample of 1997–2012 United States news stories on mass shootings found they were more often attributed to people with 'serious mental illness' than to 'dangerous weapons' [11&]. Metzl and MacLeish [12&&] systematically reviewed empirical evidence for the following: mental illness causes gun violence, psychiatric diagnosis can predict gun crime before it happens, US mass shootings teach us to fear mentally ill loners, because of the complex psychiatric histories of mass shooters, gun control 'won't prevent' another Tucson, Aurora or Newtown.

They remark that 'each of these statements is true in particular instances', but only 5% of 120 000 gun killings in the USA between 2001 and 2010 were by people with mental illness [13&], concluding that focus on individual psychopathologies may be obscuring the real issues. So far, we have referred only to people with psychosis as homicide perpetrators, but there is good evidence that psychosis makes people more vulnerable to being attacked [14]. Crump et al. [15&&], in a Swedish-population-based cohort, found that people with any mental disorder were nearly five times more likely to be victims of homicide than people without disorder; people with schizophrenia were nearly twice as likely to be victims as perpetrators of homicide. Here we cover only literature on psychosis and homicide perpetration because, Crump apart, that is all that there is.

METHOD OF LITERATURE SEARCH

Homicide by people with psychosis is a small-scale research field, not previously reviewed in this journal.

We therefore scoped the topic by extending the literature database search to publications of 2000–2017, but selected for the years2013–2017.The terms schiz_, psychos_, homicid_ and murder_, and mesh terms schizophrenia, psychotic disorders and homicide, were entered into MEDLINE, MEDLINE In-Process, PsycINFO, Embase, Web of Science. We hand searched journals which had published included articles for 2013–2017, inclusive, and reference lists of included articles. Independent reading of 100 titles and abstracts confirmed 100% agreement on inclusion. We excluded studies of violence without clearly separate homicide figures, single case studies and conference abstracts, but

used general web searches for includable publications by these authors. The online Supplementary figure (SDC1, http://links. lww.com/YCO/A40) details search results and article selection. We also consulted the UK-wide National Confidential Inquiry into Suicide and Homicide (NCISH) over the same period.

THE EPIDEMIOLOGY OF PSYCHOSIS AND HOMICIDE

A landmark article identified just five homicide studies internationally between 1990 and 2009 which, as case–control or cohort studies, allowed comparison between people with psychosis and the general population [16]. Risk of homicide among people with psychosis was significantly higher, regardless of comorbid substance misuse [0.3% schizophrenia, 0.02% general population; odds ratio 19.5, confidence interval (CI) 14.7–25.8]. It is also worth noting the consistency of the preceding plethora of studies of homicide rates among people with psychosis or psychosis rates among homicide offenders: in complete national or smaller area samples, the latter is almost invariably 5–10% [17]. New studies of this type continue, often from countries new to this area (e.g. Iran [18&]). A US records study, in one Pennsylvanian county, found that 4% of all criminal 18–40- year-old homicide cases and 7% of the over-40-year olds had nonaffective psychosis (total 10 cases) [19&]. The main reason for continuing to add to the range of countries studied is the considerable international variation in population base rates of homicide, which could affect proportionate contribution of psychosis [20–22]. In a systematic review, Large et al. [23] challenged this; Golenkov et al. [24&] then showed that in an area with a very high homicide rate – 10 per 100 000 in the Russian Federation's Chuvash Republic, over half had a mental disorder, although, in line with the weight of evidence from other studies, nearly 5% had schizophrenia. In other studies, they examined homicide recidivism by people with schizophrenia – in the Chuvash Republic [25&&] and in a systematic review [26&], which identified two further studies and unpublished data. In the Chuvash, 16 (11%), all men, of 149 homicide offenders with schizophrenia had previously killed. Recidivism was more likely in rural areas with poorer psychiatric service access. The other countries, with lower homicide rates, showed lower psychotic homicide recidivism (Finland 4.4% [27]; Sweden 6% [28&&]). The UK NCISH acquires national data on all homicides and suicides, identifies those in any contact with health services for 12 months beforehand, then asks clinicians involved to complete a detailed questionnaire; about 95% of clinicians respond Annual statistical reports allow trends analyses.

The 2017 report on England and Wales was notified of 6004 homicides (6333 victims) during the years 2005–2015 (average 576 per year) [2&&]. Annual rates fluctuate, generally and among people with psychosis specifically, but with an overall reducing trend; 365 (6%) of convictions were of people with schizophrenia or other delusional states. There were similar general and specific trends in a Swedish national cohort of anyone convicted of homicide 1987–2006 [29&&]. In England and Wales, it was rare for those with psychosis not to have been misusing alcohol or other drugs, which may partly account for the decline in post-conviction hospitalization. Among those with schizophrenia, 140 (44%) had killed within 4 weeks of their last health service contact, most with psychotic symptoms at the time. Findings were similar among the smaller Scottish and Northern Irish cohorts.

WHAT CHARACTERIZES HOMICIDAL PEOPLE WITH PSYCHOSIS?

A description of homicidal patients with psychosis in one medium secure hospital (49 homicide, 24 attempted homicide) may reveal more about admission decisions in England than about the patients [30&]. It is puzzling to find that, after matching the homicidal group with 74 'controls' on sex, age, admission, diagnosis and prior offending, homicidal patients were significantly more likely to be men, older, diagnosed with schizophrenia (not personality disorder) and less troubled in childhood. In Turkey, 30 homicidal men with schizophrenia were compared with 71 other violent and 109 nonviolent patients [31&]. The two violent groups differed from the nonviolent in older age of illness onset, longer illness at the index event, higher levels of paranoia, lower insight and higher aggression ratings; the homicidal group were distinguished only by rural residence and most likely targeting a spouse. In China, older age and various social features similarly characterized 107 homicidal people with schizophrenia (103 without) [32&]. Treatment availability was low; 40% of those with schizophrenia who had killed another person had never had treatment and only 4% of them were in treatment at the time of the homicide. In France, among 210 homicide cases before one court (Angers), 30 (17.6%) had major mental disorder histories; they were younger, more educated and more likely to have been alcohol intoxicated during the offence than those without disorder; depressive symptoms dominated among women and delusions among men [33&]. A Tunisian comparison of 36 homicidal men hospitalized with schizophrenia and 50 without criminality found that, however measured, the former had had much less treatment; they had low insight and poor medication compliance [34&].

The under-representation of women as convicted killers partly explains why they are so little studied in this context. One study focussed on them [35&]. Of all 14 women found not guilty of homicide by reason of insanity between 2006 and 2014 in Rio de Janeiro State in Brazil, eight were diagnosed with schizophrenia or similar by the researchers, but not necessarily the experts for the court. These women were generally disadvantaged and most attacked family members.
Questions about comorbidities – between psychosis and substance misuse, or psychosis and personality disorder, or being 'triply troubled' – are important, not least following claims that the violence of people with psychosis may be better explained by comorbidities or behavioural antecedents than the psychosis itself. In their 2009 meta-analysis of studies comparing samples of people with psychosis with general population samples, Fazel et al. [16] estimated that the former were about nine times as likely to be violent if misusing substances, but only twice as likely if not. In a longitudinal study, Elbogen and Johnson [36] found that psychosis predicted violence only in the presence of substance misuse, prior violence, demographics and external stressors. Even this study, however, fails to map temporal relationships, so there is little to help arguments in court on whether substance misuse might reduce mitigating aspects of psychosis; most substance misuse may follow from symptoms. Van Dongen et al. [37&], in a study of 223 court reports for people with schizophrenia completed in one specialist centre in the Netherlands, found that the subgroup of 26 people who were over the age of35onfirst offending were disproportionately likely to have committed a homicide and least likely to have comorbidities. Richard- Devantoy et al. [38&], in a systematic review of cohort, case–control studies and systematic reviews, January 2001 to December 2011, focused on psychosis, substance misuse and homicide specifically, found further support for the position that substance misuse and variables, such as sex, prior violence or external stressors, increase but do not fully explain the risk. They add that those who start violence long after psychosis onset are most likely to kill in response to psychotic symptoms, within the family, and with low recidivism risk if treated.
Seeking more objective indicators of homicidal propensities, some researchers have explored cerebral structure and function. A systematic MEDLINE search up to August 2012 [39&] yielded three studies of executive function in schizophrenia, five structural and four neuroimaging studies (although three listed); two structural and two functional studies were reports from the same sample, not exclusively of homicidal patients. There were no features which consistently distinguished between homicidal and non homicidal people with schizophrenia. One cognitive study found impaired executive functions, the other two did not. One of the structural brain studies – of 'murderers' – found grey matter augmentation in the medio frontal cortex; if really murderers, these people would have had unequivocal intent to kill and probably planned the act. Otherwise, the cerebral story was of tissue loss, implicating the whole brain as examined in one study and, taking the other studies together, almost the whole brain. Subsequently, Te´nyi et al. [40&] compared 44 patients with schizophrenia and a homicide/ attempted homicide history with 22 never violent patients and 21 'normal' controls on a checklist of 57 minor physical anomalies. They took these to be indicative of brain damage, finding them significantly more common in the homicidal group. Thus, they concluded there could be a 'stronger neurodevelopment component of cause in this subgroup of schizophrenia', but did not control for or consider other explanations of the group differences – such as age. Stratton et al. [41&] described the neuropsychology of 24 men and one woman with schizophrenia referred to one of them for expert reports for the court; they used standardized assessments with population norms, including the Wechsler Adult Intelligence Scale, Wechsler Memory Scales, Trail Making Tests and the Stroop Test. Scores on more than one scale indicated attentional dysfunction, and that most had executive and/or memory dysfunction. High rates of such dysfunctions seemun surprising in such a highly selected sample. It is striking that this evidence seemed of little relevance in court; 21 were convicted of first degree murder –thus deemed to be able form intent – and four found not guilty by reason of insanity. Perhaps had there been an option for finding diminished responsibility, this evidence would have had more impact.

VICTIMS AND METHODS

The years 2013–2017 saw little new knowledge about psychotic homicide offenders' victims. A small, Italian, descriptive study of matricide by sons [42&] confirms continuing interest in this unusual crime, exhorting understanding of the parental dynamic as well as symptoms. This is not new; there is robust, earlier evidence that the parent–child relationship often becomes distorted as the parent has to continue, in effect, practical parenting long after the child has reached majority [43]. These vulnerable dyads – father has often left home – may need special support. For England and Wales, an NCISH team clustered homicide of a parent with that of a sibling or 16þ years child as 'adult homicide' [44&&]. The mental illness rate among 'adult homicides' was higher (27%of 251 with psychosis) than among those killing a partner (7% of 1180). Among 297 filicides, about half the

women and a fifth of the men had mental illness at the time of the offence; only 18 and 12%, respectively, were psychotic [45&&].
Torrey et al. [46&] sought to quantify homicide rates within families in the USA, from two national databases – the Centers for Disease Control [13&], which captures all records of homicide, and the Supplementary Homicide Reports (SHRs) submitted by local law enforcement agencies to the Federal Bureau of Intelligence, which include details of relationships between perpetrator and victim. In 2013, there were 16 121homicides in the USA but just 6664 SHR records noting relationships. Torrey's assumption was that the SHR records were representative, so about 4000 people in the USA died by the hand of a family member that year – the largest group spousal killings (39%), the next largest parents killing children (23%) and the rest 'adult homicides' (refer to NCISH definition, above). From a literature review, they infer rates of mental disorder among types of family homicide perpetrators. The rank ordering of presumed contribution of mental disorder is similar to the NCISH findings, but with higher proportions Bureau of Intelligence, which include details of relationships between perpetrator and victim. In 2013, there were 16 121homicides in the USA but just 6664 SHR records noting relationships. Torrey's assumption was that the SHR records were representative, so about 4000 people in the USA died by the hand of a family member that year – the largest group spousal killings (39%), the next largest parents killing children (23%) and the rest 'adult homicides' (refer to NCISH definition, above). From a literature review, they infer rates of mental disorder among types of family homicide perpetrators. The rank ordering of presumed contribution of mental disorder is similar to the NCISH findings, but with higher proportions attributed to it within each band. A major continuing contribution is their Treatment Advocacy Center's 'Preventable Tragedies Database', drawing on daily press reports. Although acknowledging information gaps, Torrey et al. highlight a common thread of failures to access or get adequate treatment. Knable [47&] searched PubMed and 'the internet at large' for cases of psychotic patients killing mental health staff in the USA. He identified 33 between 1981 and 2014. Unaccompanied, young, women visiting residential facilities were most at risk. Among those in treatment, men with schizophrenia were the most risky. He describes over 40% of the staff as 'gunned down'; this group might have survived in other countries.
In a systematic literature review, Minero et al. [48&] found nine studies of relationships between psychosis and homicide method; almost everyone (96%) with psychosis in these studies had been symptomatic at the time of the offence. The one included US study found 48% used guns [49], in Italy 20% did so [50], but well under 10% in most other countries. Sharp instruments were preferred among people with schizophrenia and forms of asphyxiation by those with major mood disorders. The largest study (n¼1462 with mental disorder and weapon information) – from England and Wales – found that just 3% of homicides by people with mental disorder were by guns and 37% knives [51]. An update showed little change in such proportions over time [52]. For context, however, even in the USA, with guns widely available, only 2% of the nearly 1000 inpatients discharged to the community in the MacArthur sample used a gun in any violence in the following year [53&].

INTERVENTION

There is little literature on intervention, despite indications that many homicide perpetrators with psychosis had troubling symptoms at the time and may not have been in adequate treatment. An important perspective on the value of treatment comes from early intervention studies. Nielssen and Large [54] completed a systematic review and meta-analysis of rates of homicide during the first episode of psychosis and after treatment, in well delineated populations within specific periods. The homicide rate during first episode psychosis was 1.59 per 1000 (95% CI 1.06–2.40) but 0.11 per 1000 (95% CI) after treatment. Park et al. [55&] modelled the economic impact of early intervention in England drawing on these figures and rather old data (2003) on costs of a homicide, standardized to 2009 prices and allowing for future costs. Over 10 years, early intervention saved £80 compared with standard care. This seems low, but partly reflects the low rate of psychotic homicide.
An important but unusual perspective recognizes that the homicidal act is traumatic in itself, possibly interfering with recovery and safety. Crisford et al. [56] showed this for crime generally. So, imagine a real case: delusions cleared with medication – allowing realization that in the bloody business of releasing his mother from the clutches of an alien, there was no alien and his mother was dead. Forty-one such Men were described in 'not explicitly a research study but a discussion of the clinical material generated'.
Most had been psychotic on admission to a high security hospital; they participated in groups over 10 years [57&]. The conclusion indicated that such work helped these men to stop avoiding what they had done, so that they could consider the crime fully – and how not to do the same again.
The World Federation of Societies of Biological Psychiatry Task Force on Men's Mental Health consensus statement on prevention of homicide by men with psychiatric disorders suggested priority

is ‘to identify high risk groups, to provide adequate treatment, and to facilitate compliance with long-term treatment while considering male specific problems and needs’ [58&]. Identifying high-risk groups is feasible, but we need to identify risky individuals. Sophisticated risk assessment tools, while having other useful roles, may not help to predict any violence in psychosis [59]; they will be even less likely to do so for homicide specifically, given its lower base rate. Providing everyone with adequate treatment and facilitating long-term treatment adherence, however, could help. Early recognition and treatment of psychosis is important and, generally, detailed analyses of homicides find failures of treatment delivery and/or compliance. In Wales, for example, one post homicide inquiry noted: ‘two distinct periods during which Ms A had contact with mental health and social services. . . 1992–8 was characterised by a diagnosis of psychotic mental illness and high levels of . . . care; 2003–2005, . . .by a diagnosis of borderline personality disorder . . . but an absence of robust engagement by [mental health] services’ [60]. In the latter period, she killed a stranger. In New York State, the man whose offence led to ‘Kendra’s law’ had over 3500 pages of clinical records, but he missed two appointments, so a case worker wrote to him saying that unless he called by a specified date his case would be closed; the next day he killed [6]. Coerced community treatment under well-defined conditions binds service providers as well as service users into appropriate care, associated with lower offending rates [61]. As homicide is a rare and complex event, however, it may be impossible to devise a study to confirm that a particular course of action has specific impact.

CONCLUSION

Homicides by people with psychosis are so rare that they are not even mentioned in the 2013 United Nations Global Survey of Homicide. This may account for the limitations to much research for this group. Failures in access to treatment or in treatment adherence before a homicide are common themes. Improving treatment for people with psychosis is the best way forward. As numbers with psychosis who kill are so small, the impact of doing so may be difficult to detect, but reflected in reduction in violent offending more generally.

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Conflicts of interest

There are no conflicts of interest.

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&& of outstanding interest

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37. & van Dongen JDM, Buck NML, van Marle HJC. First offenders with psychosis: justification of a third type within the early/late start offender typology. Crime Delinquency 2014; 60:126–142. Evaluation of offence-psychosis presentations, drawing on court reports on behalf of 223 people with schizophrenia in a highly selected sample of offenders in one region of the Netherlands. The index offence of the 26 whose first offence was after age 35 was more likely to be homicide than among any others, whether offending had started before or after the apparent onset of the psychosis.
38. 38 & Richard-Devantoy S, Bouyer-Richard AI, Jollant F, Mondoloni A, et al. Homicide, schizophre´ nie et abus de substances: des liaisons dangereuses? Rev Epidemiol Sante Publique 2013; 61:339–350. A systematic review to clarify the role of substance misuse in the relationship between psychosis and violence. Eight prospective cohort or case–control studies and six other systematic reviews could be included. It adds little to the Fazel et al. [16] and Large et al. [23] reviews; the former covered the period 1970 to February 2009, the latter 1960–2008 and Richard-Devantoy 2001–2011, a shorter period, but bringing the review 2–3 years more up-to-date. Findings were almost identical to Fazel: twice the risk of homicide in uncomplicated psychosis/schizophrenia but eight to nine times with substance misuse comorbidity. Richard- Devantoy et al. noted that people with a history of personality disorder and offending before onset of schizophrenia were more likely to be substance misusers than people who started offending after the illness was established.
39. & Richard-Devantoy S, Orsat M, Dumais A, Turecki G, et al. Neurocognitive vulnerability: suicidal and homicidal behaviours in patients with schizophrenia. Can J Psychiatry 2014; 59:18–25. A systematic review of studies published 1996–2012 which explored neurocognitive deficits and brain imaging studies. Results were inconclusive. Although, as noted in the main text, there may be a problem with counting of studies, it is unlikely that this would have changed the position. They make the interesting observation that no study has compared suicide and homicide findings in this respect.
40. Te´ nyi T, Halmai T, Antal A, Benke B, et al. Minor physical anomalies are more common in schizophrenia patients with the history of homicide. Psychiatry Res 2015; 225:702–705. A small-scale Hungarian study (44 homicidal patients with schizophrenia, 22 nonviolent patients with schizophrenia and 21 ‘normal’ controls, comparing rates of minor, fixed physical anomalies – for example ‘flat occiput’, ‘furrowed tongue’. There was a higher rate in the homicidal group; they suggest this means greater likelihood of ‘aberrant brain development’.
41. & Stratton J, Brook M, Hanlon RE. Murder and psychosis: neuropsychological profiles of homicide offenders with schizophrenia. Crim Behav Ment Health 2017; 27:146–161. A description of assessments of executive functions, memory and attention in a small sample of men and women (total 25) referred for court assessments. Most had some dysfunctions. Of most interest is that the courts seemed unlikely to take this into account, but the authors, probably correctly, advise that these deficits will have to be managed in delivering treatment.
42. & Catanesi R, Rocca G, Candelli C, Carabellese F. Matricide by mentally disordered sons: gaining a criminological understanding beyond mental illness – a descriptive study. Int J Offender Ther Comp Criminol 2015; 59:1550–1563. A very small-scale, Italian study (nine cases) of the rare problem of matricide by sons. It adds little to the literature in this field, but is a reminder that perhaps not all such men are apparently psychotic at the time of their offence.
43. Estroff SE, Swanson JW, Lachicotte WS, Swartz M, et al. Risk reconsidered: targets of violence in the social networks of people with serious psychiatric disorders. Soc Psychiatry Psychiatr Epidemiol 1998; 33: S95–101.
44. && Oram S, Flynn S, Shaw J, Appleby L, et al. Mental illness and domestic homicide: a population-based descriptive study. Psychiatr Serv 2013; 64:1006–1011. As a full national, albeit records study, this study provides the best data on aspects of intrafamilial homicides of

adults that it is possible to have. Of 7124 notified cases in England and Wales 1997–2008 inclusive, just 213 (3%) parents, 12 siblings and 26 adult children [together, 'adult homicides' and 1180 (17%)] were intimate partner homicides. Under a quarter of the adult homicides and even fewer of the intimate partner homicides had been in contact with services in the year before the attack. A higher proportion of the adult homicide were judged to have had psychotic symptoms at the time of the homicide, but still only one-third.
45. && Flynn SM, Shaw JJ, Abel KM. Filicide: mental illness in those who kill their children. PLoS One 2013; 8:e58981. As for the previous study [43], data were from the UK National Confidential Inquiry into Suicide and Homicide, although using only those from England and Wales. Of 6144 homicides 1997–2006, 297 were filicides and 45 filicide–suicide. It is striking that, although the perpetrator sex ratio is much less than for other homicides, still twice as many fathers as mothers killed their child(ren). Mothers, however, were more likely to have had symptoms of mental disorder at the time of the killing (53 : 23%), although in only 17% of cases were these attributed to schizophrenia or other delusional disorders. Prevention opportunities would have been limited; only 12% of all these homicides had been in contact with mental health services in the year prior to the offence.
46. & Torrey EF, Bruce RD, Lamb HR, et al. Raising cain. Arlington, VA: Treatment Advocacy Center; 2016; Available at: http://www.treatmentadvocacycenter.-org/storage/documents/raising-cain.pdf. [Accessed 22 January 2018] Work using US national databases and a new database developed by the organization the Treatment Advocacy Center to explore intrafamily homicide. They estimate that, in 2013, there were 1149 homicides in the USA in which the offender had a serious mental illness – 29% of family homicides and 7% of all homicides and observe that this is more than the number of deaths attributed to meningitis, kidney infections or Hodgkin's disease.
47. & Knable MB. Homicides of mental health workers by patients: review of cases and safety recommendations. Psychiatr Ann 2017; 47:325–334. A study confined to the USA and relying on a limited search for literature on the killing of mental health workers, but important as this is a neglected field, and risks should be known and better understood. The author estimates that, on average, one mental health worker a year dies this way. Young, lone women workers are described as most at risk and men with schizophrenia the most risky.
48. & Minero VA, Barker E, Bedford R. Method of homicide and severe mental illness: a systematic review. Aggression Violent Behav 2017; 37:52–62. A sound, systematic review of studies of the methods by which people with schizophrenia or similar illnesses kill. That said, it is difficult to know how such work benefits understanding or management of this unusual class of individuals. Where guns are more available, use of guns is not uncommon. People with schizophrenia are apparently more likely to use a knife, but people with affective psychosis to suffocate their victim.
49. Matejkowski JC, Cullen SW, Solomon PL. Characteristics of persons with severe mental illness who have been incarcerated for murder. J Am Acad Psychiatry Law 2008; 36:74–86.
50. Catanesi R, Carabellese F, Troccoli G, et al. Psychopathology and weapon choice: a study of 103 perpetrators of homicide or attempted homicide. Forensic Sci Int 2011; 209:149–153.
51. Shaw J, Amos T, Hunt IM, Flynn S, et al. Mental illness in people who kill strangers: longitudinal study and national clinical survey. BMJ 2004; 328:734–737.
52. Rodway C, Flynn S, Swinson N, et al. Methods of homicide in England and Wales: a comparison by diagnostic group. J Forensic Psychiatry Psychol 2009; 20:286–305.
53. & Steadman HJ, Monahan J, Pinals DA, et al. Gun violence and victimization of strangers by persons with a mental illness: data from the MacArthur Violence Risk Assessment Study. Psychiatr Serv 2015; 66:1238–1241. Not about homicide, but sets the gun threat from people with treated mental disorder in the USA in perspective. Of the 951 people discharged from a brief in-patient admission, just 2% had committed a violent act using a gun.
54. Nielssen O, Large M. rates of homicide during the first episode of psychosis and after treatment; a systematic review and meta-analysis. Schizophr Bull 2010; 36:702–712.
55. & Park A-La, McCrone P, Knapp M. Early intervention for first-episode psychosis: broadening the scope of economic estimates. Early Interv Psychiatry 2016; 10:144–151. The article models economic outcomes of early intervention for psychosis in respect of employment, education, homicide and suicide. The homicide model draws on the Nielssen and Large [54] findings, and indicates a small advantage for early intervention over 'standard care'.
56. Crisford H, Dare H, EvangeliM.Offence-related posttraumatic stress disorder (PTSD) symptomatology and guilt in mentally disordered violent and sexual offenders. J Forensic Psychiatry Psychol 2008; 19:86–107.

57. & Adshead G, Ferrito M, Bose S. Recovery after homicide: narrative shifts in therapy with homicide perpetrators. Crim Justice Behav 2015; 42:70–81. Of more importance for the issue it raises rather than the quality of the data – explicitly more a discussion of clinical material than research. It is, however, a rare effort in this specific area and it highlights the potential importance of dealing with the traumatizing effect of the offence in the psychotic patient as well as anyone else, not least because the patient may remain avoidant of understanding his (the sample was entirely of men) own behaviour and thus less likely to be able to prevent repetition.
58. & Sher L, Rice T; World Federation of Societies of Biological Psychiatry (WFSBP) Task Force on Men's Mental Health. Prevention of homicidal behaviour in men with psychiatric disorders. World J Biol Psychiatry 2015; 16:212–229. This is a worthy attempt to collate good enough evidence from the literature to make a consensus statement on prevention. It takes a truly world perspective and there was clearly some system, although not quite explicit, in identifying relevant literature. One conclusion – the need to identify high-risk groups – seems wide of the mark, when the task is to identify risky individuals, and, as is evidence from some of the articles we reviewed most homicidal people do not present to health services in the year before the killing. The others – to provide adequate treatment and enhance long-term compliance – are more strongly evidence based in large studies and from single case inquiries.
59. Singh JP, Serper M, Reinharth J, Fazel S. Structured assessment of violence risk in schizophrenia and other psychiatric disorders: a systematic review of the validity, reliability, and item content of 10 available instruments. Schizophr Bull 2011; 37:899–912.
60. Healthcare Inspectorate Wales. Report of a review in respect of Ms A and the Provision of Mental Health Services, following a Homicide Committed in October 2005. Merthyr Tydfil, UK: Healthcare Inspectorate Wales; 2008 ; Available from: http://hiw.org.uk/docs/hiw/reports/080508msahomicidereporten. pdf. [Accessed 22 January 2018]
61. Swanson JW, Swartz MS. Why the evidence for outpatient commitment is good enough. Psychiatr Serv 2014; 65:808–811.